Urara MIZUSHIMA*: **On the identity of three mosses (Taxonomic notes on Japanese mosses 1)**

水島うらら*: *Barbula reflexa* (Brid.) Brid. に合一されるべき 3 種の蘚について（日本産蘚類寸評 1）

The author found that *Triquetrella recurvifolia*, *T. tenuicaulis*, *Leptodontium japonicum* and *Barbula reflexa* are identical with each other.

a) *Triquetrella recurvifolia* Dix. et Sakurai ex Sakurai

Triquetrella recurvifolia was collected in Shinyokoe-mura, Echigo Province (Niigata Prefecture), Honshu by late Mr. Nizo Iwasaki and was sent to Dr. K. Sakurai who sent it to his friend Dr. H. N. Dixon and asked his advice about it. Dr. Dixon determined it as *Triquetrella recurvifolia* n. sp. and Dr. Sakurai was described it in Bot. Mag. Tokyo **53**: 63 (1939) based on Iwasaki's specimen (Herb. K. Sakurai no. 9387). But the distribution of the genus *Triquetrella* is in Africa, Spain, Australia, South America, California, U. S. and India. It may be said to be very extraordinary case that it was found in the cool Echigo Province, central Japan, and I doubt that if our plant is a true *Triquetrella* or not. Through Dr. Sakurai's courtesy I looked for the type specimen in his herbarium, but I could not find it. Instend of the type specimen, there is a specimen which was collected by Mr. N. Iwasaki in Imai-mura, Nishi-kubiki-gun, Echigo Province (no. 11440) and is indicated as "Typus." After a careful examination of this specimen I desired to exclude it from the genus *Triquetrella*.

In C. Müller's original work in which he established the new genus *Triquetrella* (Östr. Bot. Zeitsch. **47**: 420. 1897), he described as follows: "Caulis tristichaceo-foliosus; folia dense imbricata madore subrecurva; peristomii simplicis dentes 16 externi breves filiformes simplices homogeneo-hyalini nec transversim striati nec trabeculati interdem paulisper fissiles cornei solitarii vel aggregati." Therefore, it is very easy to judge on fertile plants by an examination of peristome teeth, but unfortunately our sample lacked the fruit. From the appearance and the shape of leaves we could not distinguish *Triquetrella* and some *Barbulas*. The writer tried to examine the inner structure of stem. She observed the existence of the central strand of somewhat differentiated celles in its stem, which is never found in such genera as *Triquetrella*, *Leptodontium* and *Rhamphidium* but is generaly found in *Hyophila*, *Barbula*, *Didymodon* etc. (in

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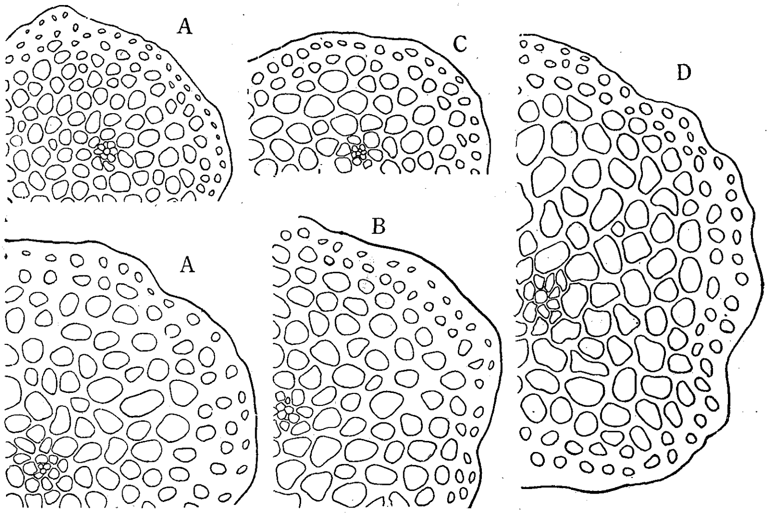

Fig. 1. Transection of stem. (×274). A. *Barbula reflexa* (Brid.) Brid. B. *Triquetrella recurvifolia* Dix. & Sakurai (from specimen of Imai-mura, Prov. Echigo). C. *Triquetrella tenuicaulis* Sakurai (from Holotype specimen). D. *Leptodontium japonicum* Sakurai (from Holotype specimen).

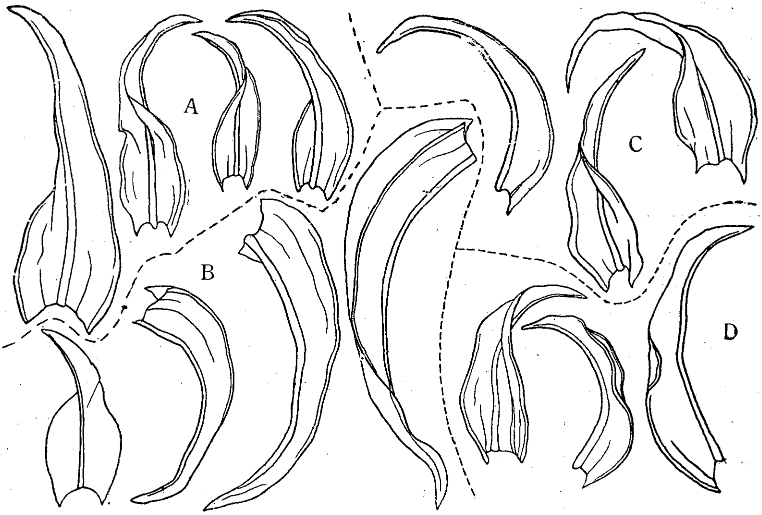

Fig. 2. Leaves (×22) A. *Barbula reflexa* (Brid.) Brid. B. *Triquetrella recurvifolia* Dix. & Sakurai (from specimen of Imai-mura, Prov. Echigo). C. *Triquetrella tenuicaulis* Sakurai (from Holotype specimen). D. *Leptodontium japonicum* Sakurai (from Holotype specimen).

Barbula it is not constant within most species.) This fact shows that the present sample may belong to *Hyophila*, *Barbula* or *Didymodon* but not to *Triquetrella*. This plant has reddish brown color and the appearance of leaves is semitriquetrous. The leaves are contorted when dry, strongly recurved when moist, revolute to above the middle and with deep plicae at the base on each side of costa. Lamina cells are strongly papillose on both surfaces. Such characters of this moss have good reason to unite it to *Barbula reflexa*.

b) *Triquestrella tenuicaulis* Sakurai

The species was colleted for the first time by Dr. N. Takaki on the rock of the river-side of Koshibu-gawa, running at the foot of Mt. Akaishi, South Japan Alps, a well known calcareous area in central Japan. Afterwards, a specimen was collected by Mr. T. Higuchi on limestone at Takine-machi, Tamura-gun, Iwaki Province, North Honshu, which was determined by Dr. K. Sakurai as the same species. In these two specimens the stems are very slender as Dr. Sakurai described in his original description. But in the cross section, it has also somewhat differentiated cells which consist the central strand as in *Barbula reflexa*, and I could not find any difference between the two species. In *barbula reflexa* the thickness of stem is comparatively variable as I illustrated two cases of them in Fig. 1, A. I believe that *Triquetrella tenuicaulis* is identical with *Barbula reflexa*.

c) *Leptodontium japonicum* Sakurai ex K. Oti

It was collected by Mr. K. Oti on crystaline schist at about 700 m above the sea level in Kazuno-machi, Nii-gun, Iyo Province, Shikoku. The characteristic sign of the species is described as "closely allied to *L. recurvifolium* (Tayl.) Lindb., but the leaf margin is not serrate." But in *Leptodontium*, the serrated leaf margin is one of the characteristics of the genus. The examination of the holotype specimen shows that the leaves are entire and contorted or crisped when dry and strongly squarrose when moist and the costa is never excurrent. On both surfaces of lamina cells and dorsal surface of costa have very high papillae. And dorsal surface of costa is consisted of linear cells. Moreover, the specimen has a central strand in its stem against the diagnostic character of the genus. About the stem, *Leptodontium japonicum* was described "Caulis repens vel decumbens." The form of this plant is unusual in Pottiaceae, in which the most plants are erect or suberect in their appearance. But the examination of the specimen shows that some stems are more or less decumbent but mostly erect or suberect and never repent. So the description must be corrected as "Caulis erectus vel decumbens." The specimen from Nii-gun has yellowish-green

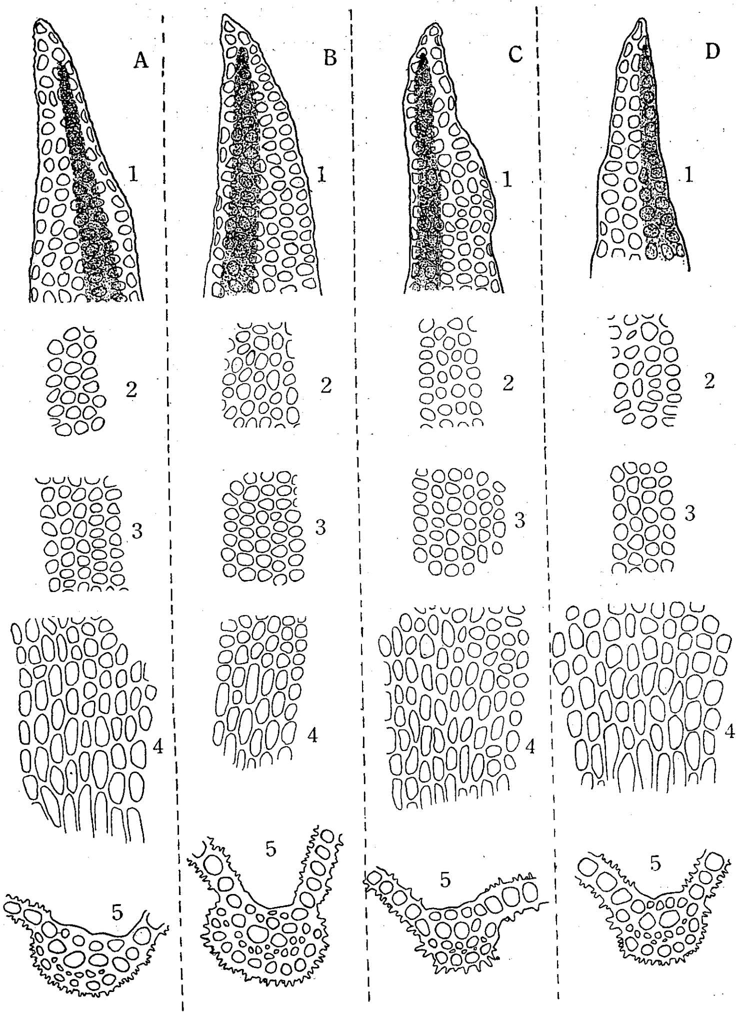

Fig. 3. A, 1-5. *Barbula reflexa* (Brid.) Brid. (from Musci Japonici Exicati ser. 9, no. 404). B, 1-5. *Triquetrella recurvifolia* Dix. & Sakurai (from specimen of Imai-mura, Prov. Echigo). C, 1-5. *Triquetrella tenuicaulis* Sakurai (from Holotype specimen). D, 1-5. *Leptodontium japonicum* Sakurai (from Holotype specimen). 1. Apical part of leaf (×247). 2. Upper leaf cells (×247). 3. Median leaf cells (×247). 4. Basal leaf cells (×247). 5. Transaction of costa (×247).

color. Mr. I. Nagano says that *Barbula reflexa* has reddish brown color when it grows on the calcareous rocks and has yellowish-green color when it grows on the non-calcareous rocks. Then all above-mentioned characters remined the writer that it is better to classify it as *B. reflexa*.

From the above reason, these species should be treated as follows:

Barbula reflexa (Brid.) Brid. Method. Musc. 93 (1822)

Tortula reflexa Brid. Musc. Recent. Suppl. **1**: 25 (1806). *Triquetrella recurvifolia* Dixon et Sakurai ex Sakurai in Bot. Mag. Tokyo **53**: 63 (1939). *Leptodontium japonicum* Sakurai ex K. Oti in Bot. Mag. Tokyo **60**: 84 (1949). *Triquetrella tenuicaulis* Sakurai in Journ. Jap. Bot. **27**: 280 (1952).

Specim. exam.—Honshu. Prov. Iwaki: Tamura-gun, Takine-machi (Higuchi 4917). Prov. Shimotsuke: Nikko, Kegon-fall (Yagi 594–Ik.1) 12544). Prov. Musashi: Chichibu-gun, Tochimoto- Mt. Azusa (Maeda 1017–U. M.2) 10760), Taiyoji-temple (Nagano?-U. M. 10761), Mt. Buko (Igo–U. M. 607, U. M. 2882, 7912, Nag.-U. M. 10759, 10767), Nishitama-gun: Mt. Tenso (U. M. 10931), Nippara-machi (U. M. 8091, 8097, 8132, Musc. Jap. Exic. ser. 9, 404). Prov. Echigo: Higashi-kanbara-gun, Agekawa (Ik.–Musc. Jap. Exic. ser. 13, 603), Nishi-kubiki-gun; Imai-mura Iwasaki (7921–S.3) 11440, Iwasaki 7943–U. M. 10764), Kotoki-mura (Ik. 26887). Prov. Ettchu: Kotōge (Sasaoka–Tokyo Sci. Mus. 40546). Prov. Kai: Foot of Mt. Akaishi (Takaki 6692–S. 20088 type of *Triquetrella tenuicaulis* Sak.), Misaka-pass (Mizutati–Musc. Jap. Exic. ser. 12, 557). Prov. Ohmi: Mt. Ibuli (S. 14658, Takahashi–Sasaoka 1507), Mt. Suzugatake (Hashimoto–U. M. 10762). Isl. Awaji. Prov. Awaji: Mt. Kashiwabara (Tsuchiga 2387–U. M. 11009). Shikoku. Prov. Iyo: Niigun, Kazuno-machi (Oti 611–S. 15026 type of Leptodontium japonicum Sakurai, Oti 4715, 1196) Kushu. Prov. Higo: Ituski (Mayebara 2468)

Futher I should like to add add that the specimen which has determined as *Barbula fallax* Hedw. from Mt. Ibuki, Ohmi Province, central Japan and now preserved in national Science Museum in Tokyo is nothing but *B. reflexa* and it may be the same as the one cited by Mr. E. Ihsiba in his "Nipponsan Senrui Sosetsu 69 (1929)."

I wish to express sincere thanks to Dr. K. Sakurai, Kyoritsu Pharmaceutical College, Dr. H. Hara, Univ. of Tokyo, Dr. Y. Kobayashi, National Science Museum of Tokyo, Mr. K. Oti, Saijoh High School, Shikoku and Mr. I. Nagano, Chichibu

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1) Ik.—Ikegami
2) U. M.—U. Mizushima
3) S.—Sakurai

Museum of Natural History for their kind guidance and help in supplying available specimens and literature.

邦産の *Triquetrella* 属には 3 種が記載されていてその中，*T. recurvifolia* Dix. et Sakurai 及び *T. tenuicaulis* Sakurai の原産地はそれぞれ越後，新横江村及び南アルプス，赤石岳麓，小渋川沿岸である。(*T. nipponensis* Sakurai に関しては次の機会に述べる。) これらの産地はいずれも比較的寒冷地で，熱帯～亜熱帯植物を含む属の分布地としては特異である。この疑問を解く為に *Triquetrella* 及びその近似の種類を検討して見た。

a) *T. recurvifolia* の holotype 標本は桜井博士の標本庫に見出されなかったが，その代り未発表乍ら桜井博士が新しくタイプと標示された標本を検する事が出来た。これは真のタイプ同様不実である。茎に対する葉の着き方は概ね 3 列で一見 *Triquetrella* 属植物を想わせるが，茎には導束があり，葉の中肋は葉頂下に終るなどの点で異っている。葉が強く反捲し葉縁は下部では外巻し基部に 2 縦襞を持つ事や中肋の断面，葉面のパピラの状態などからヨーロッパ，中～北米，コーカサス等の石灰岩地から知られている *Barbula reflexa* (Brid.) Brid. によく一致する。

b) *T. tenuicaulis* Sakurai は茎が繊弱である点を強調して設けられた種であるが，その他の点では前種と全く変りがない。*B. reflexa* では茎の太さは相当に変化し *T. tenuicaulis* はその変化範囲に含まれる。

c) *Leptodontium japonicum* Sakurai は北欧産の *L. recurvifolium* に似るが葉縁に鋸歯が出ないので新種として書かれたものである。しかし *Leptodontium* 属では鋸歯が出るという事はむしろ属としての通性である。又，茎には導束がないのが普通であるが，この標本では導束を有するので真の *Leptodontium* とは思われない。茎，葉の性状から矢張り *B. reflexa* とするのが妥当であろう。

(p. 213 より続く) (continued from p. 213)

costa 2/3 length of leaf. Branch leaves similar to the stem leaves in form, but bigger than those, about 1.6×0.6 mm, more or less erect-patent when dry, costa 2/3 length of leaf, comparatively stout at median leaf, cells rhomboid, 10×57 μ, basal and alar cells quadrate to oblonghexagonial. Seta smooth, yellowish brown, varying in length 2.3–2.8 cm. Capsules reddish brown, oblong-ovoid, inclined, ca. 1.8–2 mm.

Hab. Honshu; Fukushima pref. Nishishirakawa-gun, 280 m alt., July 10, 1952, coll. R. Watanabe, no. 156, in Herb. R. Watanabe.

I take this opportunity to express my thanks to Dr. Shinsuke Hattori, Dr. Kyuichi Sakurai and Dr. Norio Takaki. ([redacted] Toshima-ku, Tokyo, 豊島区[redacted])